substrate, wherein the arrayed wavelength grating device comprises

a plurality of electro-optical waveguides formed within the monocrystalline compound semiconductor layer, each waveguide of the plurality of electro-optical waveguides carrying an optical signal of a distinct wavelength, and

a first electrode formed in the monocrystalline compound semiconductor layer and above the plurality of electro-optical waveguides, the first electrode operable to provide a distinct phase shift to each waveguide of the plurality of electro-optical waveguides in response to an application of voltage to the first electrode.

10. (Amended) The semiconductor structure of claim 1, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocrystalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a temperature sensitivity of the plurality of electro-optical waveguides.

11. (Amended) The semiconductor structure of claim 1, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocyrstalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a polarization-dependent wavelength of the plurality of electro-optical waveguides.

12. (Amended) The semiconductor structure of claim 1, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocyrstalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a channel wavelength offset of the plurality of electro-optical waveguides.

13. (Amended) A process for fabricating a semiconductor structure comprising:

providing a monocrystalline silicon substrate;

depositing a monocrystalline perovskite oxide film overlying the monocrystalline silicon substrate, the film having a thickness less than a thickness of the material that would result in strain-induced defects;

forming an amorphous oxide interface layer containing at least silicon and oxygen at an interface between the monocrystalline perovskite oxide film and the monocrystalline silicon substrate;

epitaxially forming a monocrystalline compound semiconductor layer overlying the monocrystalline perovskite oxide film; and

forming an arrayed wavelength grating device overlying the monocrystalline silicon substrate,

wherein the arrayed wavelength grating device comprises

a plurality of electro-optical waveguides formed within the monocrystalline compound semiconductor layer, each waveguide of the plurality of electro-optical waveguides carrying an optical signal of a distinct wavelength, and

a first electrode formed in the monocyrstalline compound semiconductor layer and above the plurality of electro-optical waveguides, the first electrode operable to provide a

distinct phase shift to each waveguide of the plurality of electro-optical waveguides in response to an application of voltage to the first electrode.

22. (Amended) The process of claim 13, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocyrstalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a temperature sensitivity of the plurality of electro-optical waveguides.

23. (Amended) The process of claim 13, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocyrstalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a polarization-dependent wavelength of the plurality of electro-optical waveguides.

24. (Amended) The process of claim 13, wherein:

the arrayed wavelength grating device further comprises

a planar waveguide region in optical communication with the plurality of electro-optical waveguides, and

a second electrode formed in the monocyrstalline compound semiconductor layer and above the planar waveguide region, the second electrode operable to tune a channel wavelength offset of the plurality of electro-optical waveguides.--

Please cancel Claims 9 and 21.